

WHAT IS CLAIMED IS:

1. An image sensing apparatus which comprises an image sensing element and can exchange a lens, comprising:

5 a storage device for storing shading correction coefficients respectively corresponding to pixels in a two-dimensional matrix on a plane of the image sensing element; and

10 a correction device for making a correction calculation of pixel data read out from each pixel of the image sensing element by extracting the shading correction coefficient associated with the corresponding pixel from the shading correction coefficients stored in said storage device,

15 wherein said storage device stores the shading correction coefficients while classifying the shading correction coefficients into components in two orthogonal directions on the plane of the image sensing element, and

20 said correction device extracts two shading correction coefficients from the shading correction coefficients stored in said storage device in accordance with addresses of the corresponding pixel in the two directions, and multiplies the pixel data read
25 out from the corresponding pixel by the two extracted shading correction coefficients in turn to correct the pixel data.

2. The apparatus according to claim 1, further comprising:

an extraction device for extracting exit pupil position information stored in the lens; and

5 a calculation device for calculating shading correction coefficients on the basis of the exit pupil position information extracted by said extraction device, and sending the shading correction coefficients to said storage device.

10 3. The apparatus according to claim 2, wherein said calculation device calculates the shading correction coefficients on the basis of the exit pupil position information extracted by said extraction device, and an image height of a corresponding pixel.

15 4. The apparatus according to claim 3, further comprising:

a correction device for correcting the exit pupil position information extracted by said extraction device in accordance with at least one of a zoom
20 position, focus position, image height, and aperture value of the lens, and sending the corrected exit pupil position information to said calculation device.

5. The apparatus according to claim 3, wherein the exit pupil position information is information that
25 represents a distance between the lens and the image sensing element on an optical axis.

6. The apparatus according to claim 3, wherein the image height is a distance between a position of a pixel of interest and a point on an optical axis on the plane of the image sensing element.

5 7. An image sensing apparatus which comprises an image sensing element and can exchange a lens, comprising:

a storage device for storing shading correction coefficients respectively corresponding to pixels of
10 the image sensing element; and

a correction device for making a correction calculation of pixel data read out from each pixel of the image sensing element by extracting the shading correction coefficient associated with the
15 corresponding pixel from the shading correction coefficients stored in said storage device,

wherein said correction device independently corrects pixels which are influenced by a color filter, which does not transmit a specific wavelength range and
20 is inserted between the lens and the image sensing element, and pixels which are not influenced by the color filter, on the basis of shading correction coefficients stored in said storage device.

8. The apparatus according to claim 7, further
25 comprising:

an extraction device for extracting exit pupil position information stored in the lens; and

a calculation device for calculating shading correction coefficients on the basis of the exit pupil position information extracted by said extraction device, and sending the shading correction coefficients to said storage device.

9. The apparatus according to claim 8, wherein said calculation device calculates the shading correction coefficients on the basis of the exit pupil position information extracted by said extraction device, and an image height of a corresponding pixel.

10. The apparatus according to claim 9, further comprising:

a correction device for correcting the exit pupil position information extracted by said extraction device in accordance with at least one of a zoom position, focus position, image height, and aperture value of the lens, and sending the corrected exit pupil position information to said calculation device.

11. The apparatus according to claim 9, wherein the exit pupil position information is information that represents a distance between the lens and the image sensing element on an optical axis.

12. The apparatus according to claim 9, wherein the image height is a distance between a position of a pixel of interest and a point on an optical axis on the plane of the image sensing element.

13. A shading correction method applied to an image sensing apparatus, which comprises an image sensing element and can exchange a lens, comprising:

the storage step of storing in a storage device
5 shading correction coefficients respectively
corresponding to pixels in a two-dimensional matrix on
a plane of the image sensing element; and

the correction step of making a correction
calculation of pixel data read out from each pixel of
10 the image sensing element by extracting the shading
correction coefficient associated with the
corresponding pixel from the shading correction
coefficients stored in said storage device,

wherein the storage step includes the step of
15 storing in said storage device the shading correction
coefficients while classifying the shading correction
coefficients into components in two orthogonal
directions on the plane of the image sensing element,
and

20 the correction step includes the step of
extracting two shading correction coefficients from the
shading correction coefficients stored in said storage
device in accordance with addresses of the
corresponding pixel in the two directions, and
- 25 multiplying the pixel data read out from the
corresponding pixel by the two extracted shading

correction coefficients in turn to correct the pixel data.

14. The method according to claim 13, further comprising:

5 the extraction step of extracting exit pupil position information stored in the lens; and

the calculation step of calculating shading correction coefficients on the basis of the exit pupil position information extracted in the extraction step, and sending the shading correction coefficients to said storage device.

15. The method according to claim 14, wherein the calculation step includes the step of calculating the shading correction coefficients on the basis of the exit pupil position information extracted in the extraction step, and an image height of a corresponding pixel.

16. The method according to claim 15, further comprising:

20 the correction step of correcting the exit pupil position information extracted in the extraction step in accordance with at least one of a zoom position, focus position, image height, and aperture value of the lens, and supplying the corrected exit pupil position information to the calculation in the calculation step.

17. A shading correction method applied to an image sensing apparatus, which comprises an image sensing element and can exchange a lens, comprising:

the image sensing step of obtaining pixel data
5 from the image sensing element; and

the correction step of making a correction
calculation of pixel data read out from each pixel of
the image sensing element by extracting the shading
correction coefficient associated with the
10 corresponding pixel from shading correction
coefficients stored in a storage device, which stores
shading correction coefficients respectively
corresponding to pixels of the image sensing element,

wherein the shading correction coefficients are
15 independently stored in the storage device in
correspondence with pixels which are influenced by a
color filter, which does not transmit a specific
wavelength range and is inserted between the lens and
the image sensing element, and pixels which are not
20 influenced by the color filter.

18. The method according to claim 17, further
comprising:

the extraction step of extracting exit pupil
position information stored in the lens; and
25 the calculation step of calculating shading
correction coefficients on the basis of the exit pupil
position information extracted in the extraction step,

and sending the shading correction coefficients to said storage device.

19. The method according to claim 18, wherein the calculation step includes the step of calculating the shading correction coefficients on the basis of the exit pupil position information extracted in the extraction step, and an image height of a corresponding pixel.

20. The method according to claim 19, further comprising:

the correction step of correcting the exit pupil position information extracted in the extraction step in accordance with at least one of a zoom position, focus position, image height, and aperture value of the lens, and supplying the corrected exit pupil position information to the calculation in the calculation step.

21. A program for making a computer implement a shading correction method cited in claim 13.

22. A storage medium for computer-readably storing a program cited in claim 21.

23. A program for making a computer implement a shading correction method cited in claim 17.

24. A storage medium for computer-readably storing a program cited in claim 23.